WHAT IS CLAIMED:

1. A method of laser peening a hidden surface of a workpiece, the hidden surface not being line-of-sight accessible to a laser beam for treatment, said method comprising the steps of:

providing a selectively positionable laser peening apparatus, said selectively positionable laser peening apparatus having a laser transmission end, said laser transmission end being variably and selectively positionable and thereby configured for variably and selectively directing laser energy upon the hidden surface;

directing said laser transmission end toward the hidden surface; and

delivering laser energy, via said laser transmission end, upon the hidden surface to thereby initiate laser peening thereof.

2. The method of claim 1, wherein said selectively positionable laser peening apparatus comprises:

a pulsed laser system configured for generating the laser energy used for laser peening; and

a laser directing unit operatively receiving and channeling the laser energy generated by said pulsed laser system, said laser directing unit including said laser transmission end, said laser directing unit being capable of variably and selectively positioning said laser transmission end, said laser directing unit thereby

configured for variably and selectively directing laser energy upon the hidden surface via said laser transmission end.

3. The method of claim 2, wherein said laser directing unit includes one of a fiber-optic laser delivery mechanism and a telescopic articulated arm mechanism.

4. The method of claim 3, wherein said laser directing unit includes a fiber-optic laser delivery mechanism, said fiber-optic laser delivery mechanism including at least one laser coupled to at least one fiber optic cable.

5. The method of claim 3, wherein said selectively positionable laser peening apparatus includes a telescopic articulated arm mechanism.

6. The method of claim 5, wherein said telescopic articulated arm mechanism comprises:

a laser delivery tubing through which a laser beam is transmitted;

at least one mirror mounted within said laser delivery tubing, each said mirror positioned so as to redirect the laser beam;

an adjustable telescoping member coupled with said laser delivery tubing, said adjustable telescoping member configured for receiving the laser beam therethrough, said adjustable telescoping

member having a laser transmission opening at said laser transmission end;

one of a prism and highly reflective mirror mounted in said adjustable telescoping member adjacent said laser transmission opening, said one of a prism and highly reflective mirror being positioned and configured for redirecting the laser beam within said adjustable telescoping member outwardly through said laser transmission opening; and

a focusing lens located within said laser transmission opening of said adjustable telescoping member, said focusing lens configured for focusing the laser beam redirected by said one of a prism and highly reflective mirror, the laser beam thereby being focused upon the hidden surface of the workpiece.

7. The method of claim 5, wherein said telescopic articulated arm mechanism has an adjustable telescoping member and a robotic unit operatively coupled with said adjustable telescoping member, said robotic unit being configured for translating and rotating said adjustable telescoping member.

8. The method of claim 1, wherein the workpiece is a turbine disk having a dovetail slot, the hidden surface being located in the dovetail slot.

9. A laser peening apparatus for laser peening a hidden surface of a workpiece, the hidden surface not being line-of-sight accessible to laser energy for treatment thereof, said apparatus comprising:

a pulsed laser system configured for generating the laser energy used for laser peening; and

a laser directing unit operatively receiving and channeling the laser energy generated by said pulsed laser system, said laser directing unit including a laser transmission end, said laser directing unit being capable of variably and selectively positioning said laser transmission end, said laser directing unit thereby configured for variably and selectively directing laser energy upon the hidden surface via said laser transmission end.

10. The laser peening apparatus of claim 9, wherein said laser directing unit includes one of a fiber-optic laser delivery mechanism and a telescopic articulated arm mechanism.

11. The laser peening apparatus of claim 10, wherein said laser directing unit includes a fiber-optic laser delivery mechanism, said fiber-optic laser delivery mechanism including at least one laser coupled to at least one fiber optic cable, each said fiber optic cable being flexible so as to facilitate redirection of laser energy transmitted therethrough.

12. The laser peening apparatus of claim 11, wherein said pulsed laser system includes a single laser unit for generating pulsed laser energy, said fiber-optic laser delivery mechanism including a single fiber optic cable.

13. The laser peening apparatus of claim 11, wherein said pulsed laser system includes a single laser unit for generating pulsed laser energy, said fiber-optic laser delivery mechanism including at least two fiber optic cables.

14. The laser peening apparatus of claim 11, wherein said pulsed laser system includes a first laser unit and a second laser unit for generating pulsed laser energy, said first laser unit beam being generally orthogonally aligned relative to said second laser unit beam, said first laser unit and said second laser unit each directing laser energy toward a polarizing beam splitter, said fiber-optic laser delivery mechanism including a single fiber optic cable, said fiber optic cable receiving laser energy from said first laser unit and said second laser unit via said beam splitter.

15. The laser peening apparatus of claim 11, wherein said pulsed laser system includes a first plurality of laser units for generating pulsed laser energy, said fiber-optic laser delivery mechanism including a second plurality of fiber optic cables, each said laser unit being coupled with a corresponding said fiber optic cable.

16. The laser peening apparatus of claim 11, wherein said fiber-optic laser delivery mechanism has an output focusing lens associated therewith proximate said laser transmission end for directing the laser energy carried thereby upon the hidden surface.

17. The laser peening apparatus of claim 11, wherein each said fiber-optic cable has a core that is one of solid and hollow.

18. The laser peening apparatus of claim 10, wherein said laser directing unit includes a telescopic articulated arm mechanism.

19. The laser peening apparatus of claim 18, wherein said telescopic articulated arm mechanism comprises:

a laser delivery tubing through which a laser beam is transmitted;

at least one mirror mounted within said laser delivery tubing, each said mirror positioned so as to redirect the laser beam;

an adjustable telescoping member coupled with said laser delivery tubing, said adjustable telescoping member configured for receiving the laser beam therethrough, said adjustable telescoping member having a laser transmission opening at said laser transmission end;

one of a prism and a highly reflective mirror mounted in said adjustable telescoping member adjacent said laser transmission opening, said prism being positioned and configured for redirecting

the laser beam within said adjustable telescoping member outwardly through said laser transmission opening; and

a focusing lens located within said laser transmission opening of said adjustable telescoping member, said focusing lens configured for focusing the laser beam redirected by said prism, the laser beam thereby being focused upon the hidden surface of the workpiece.

20. The laser peening apparatus of claim 18, wherein said telescopic articulated arm mechanism has an adjustable telescoping member and a robotic unit operatively coupled with said adjustable telescoping member, said robotic unit being configured for translating and rotating said adjustable telescoping member.

21. The laser peening apparatus of claim 9, wherein said pulsed laser system is configured for generating a laser power such that a laser intensity on the surface of the workpiece is to be greater than about 4 GW/cm^2.

22. The laser peening apparatus of claim 9, wherein said pulsed laser system is configured for generating a laser beam having a pulse width of less than about 50 ns and an operational frequency of greater than about 1 Hz.

23. The laser peening apparatus of claim 9, wherein said pulsed laser system employs an active laser medium, said active laser medium being one of Nd-doped phosphate glass, YAG, and YLF.